Prevalence of Obesity among Adolescents in Senior Secondary Schools in Oyo State, Nigeria

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Abstract

This study was carried out to examine the prevalence of obesity among adolescents in Oyo state. A total of 821 [male (383) and female (438)] aged 12–18 years were selected from 10 public and private secondary schools using multi-stage sampling techniques. Data collected were subjected to descriptive statistics. Results showed that majority (73.3%) of the respondents were between 15–18 years. Prevalence of obesity among the respondents using BMI-for-Age percentile shows that majority (82.5%) of the respondents were between 5th–85th percentiles (normal), 2.2% were between 85th–95th percentiles (overweight), while 2.6% percentile were above 95th percentile (obese). Both sexes show a significant difference ($P \leq 0.05$) in anthropometric measurement [height, body mass index (BMI-for-Age), triceps, biceps, waist circumference, hip circumference and percentage body fat]. Therefore, the study concluded that the prevalence of obesity among adolescents is relatively low and highlights the need for larger population-based studies to ascertain the overall prevalence within the state.

Keywords: Obesity; Overweight; Adolescent; Nutrient Intake; BMI-for-Age; Body Fat

Introduction

Obesity is quickly becoming one of the most prominent conditions affecting children and adolescents [1]. Adolescents are nutritionally vulnerable age group, considering their increased nutritional needs, eating patterns, life style and susceptibility to environmental influences [2,3]. Overweight and obesity is an escalating health problem in both developed and developing countries. The International Obesity Task Force report showed that 1 in 10 children worldwide is overweight; a total of 155 million children and adolescents are overweight and around 30–45 million are classified as obese [4].

The prevalence of obesity has increased substantially over the last few decades and indications are that this trend will continue [5]. In Nigeria, there is a dearth of data on the prevalence of overweight and obesity. A study by Omolola et al. [6] in south western Nigeria reported no adolescent to be neither overweight nor obese among the rural dwellers studied. Another study in

Lagos, Nigeria Ben-Bassey et al. [7] reported overall prevalence rates of overweight and obesity in the urban and rural areas to be 3.7% and 0.4%, and 3.0% and 0.0%, respectively. Furthermore, the prevalence rates of obesity and being overweight in a study carried out in Cross River, Nigeria were 1.7% and 6.8%, respectively [8].

Considering the importance of obesity complications for the health state of society and its increasing rate, careful evaluation, monitoring and follow up of obesity in children and adolescents should be a great importance. Therefore, the aim of this study was to find the prevalence of obesity in Nigerian adolescents in an urban community.

Subjects and Methods

Subject and sample size

The subjects were urban adolescent attending Senior Secondary School Children in the age group of 12–18 years in Oyo State, Nigeria. Subjects were selected from Government and Private schools, in order to recruit them from different socioeconomic strata. Total sample size was 821 respondents from both public (447) and private (375) Schools in the selected Local Government Areas.

Methodology

The study was descriptive and cross-sectional covering public and private secondary schools in Ibadan North and Ibadan South-West Local Government Areas of Oyo State. Data was collected during 2011/2012 academic session (second term).

Sampling procedure

The samples for this study were drawn from 20 public and private secondary schools within the two selected local government area (Ibadan North and Ibadan South-West) of Oyo State, Nigeria. The schools were randomly selected from a list of all the schools in the local government areas. Twenty schools were the targeted study sample. Respondents were selected using multistage sampling techniques. Both boys and girls were eligible to participate in the study.

Method of data collection

The data was collected using a validated structured sectionalized questionnaire. The questionnaire has information on (personal data, socio-economic and demographic, physical activities, dietary and food intake pattern, anthropometric measurement, 24-hour dietary recall and food frequency). Questionnaire written in English was administered to the selected adolescents from each of the selected class and the subjects were requested to record their responses in the presence of investigators, who provided necessary clarification to the queries, if any, in a classroom

Equipment and tools for data collection

Portable anthropometric heightiometer was used to measure height of the adolescents and digital OMRON Body Composition (BF 508) was used to measure the weight (Kg) and body fat (%). Harpenden skinfold calliper was used to measure skinfold (mm). Waist and hip circumferences were measured using non-elastic fibre measuring tapes to the nearest cm.

Data analysis

The data was cleaned, and then entered into the computer, for analysis using SPSS, version 16.0 and Epi Info (TM) 3.5.1. The data generated were analyzed using descriptive statistics such as means, standard deviations, percentages and frequencies of participant's characteristics anthropometrical tests measurements were computed and provided for each age and gender. The differences between male and female adolescents were determined using students t-test.

Results

Socioeconomic characteristics of the respondents

Female respondents constituted the highest percentage being 53.3% while male constituted 46.7%. Respondent's age were between 12-18years, 12-14 year old respondents had least percentage 26.7% while 15-18 year old were 73.3%. Socioeconomic status revealed that majority of the respondent's parent 75.2% belong to the middle socioeconomic status (MSES) while 11.0% and 13.9% belongs to low (LSES) and high (HSES) socioeconomic status. Also, 12.5% of the respondents went to school through public transport and parent's car, 39.2% went to school with public transport while 14.9% trek to school (Table 1).

Anthropometric and body composition: The respondents showed that except, for weight and waist-hip ratio (WHR), all other anthropometric and body composition variables were significantly different in both sexes ($p \leq 0.05$). The mean values for height, Body Mass Index (BMI), triceps, biceps, waist circumference, hip circumference, percentage body fat, were significantly higher in girls compared to the boys. There is no significant difference between the mean Weight and Waist-Hip Ratio (WHR) of the boys and girls (Table 2).

Prevalence of Obesity (Body Mass Index for Age Percentile): Majority of the respondents 82.5% were between 5th-85th percentiles, 2.2% were between 85th-95th percentiles,

Table 1: Socioeconomic Characteristics of the Respondents.

	Frequency	Percentage
Sex		
Male	383	46.7
Female	438	53.3
Total	821	100.0
Age		
12-14	219	26.7
15-18	602	73.3
Total	821	100.0
Education level of Father		
No education	5	0.6
Primary education	60	7.3
Secondary education	266	32.4
Tertiary education	490	59.7
Total	821	100.0
Education level of Mother		
No education	18	2.2
Primary education	72	8.8
Secondary education	262	31.9
Tertiary education	496	57.1
Total	821	100.0
Occupation of Father		
Civil servant	240	29.2
Lecturer	21	2.6
Personal business	364	44.3
Teacher	141	17.2
Employee of private organization	55	6.7
Total	821	100.0
Occupation of Mother		
Civil servant	211	25.7
Lecturer	15	1.8
Personal business	463	56.4
Teacher	110	13.4
Employee of private organization	22	2.7
Total	821	100.0
How do you get to school		
School bus	27	3.3
Parent's car	247	30.1
Public transport	322	39.2
Trekking	122	14.9
Parent's car & public transport	103	12.5
Total	821	100.0
Socioeconomic Status		
LSES	90	10.9
MSES	617	75.2
HSES	114	13.9
Total	821	100.0

Table 2: Anthropometric Characteristics of the Respondents.

Variable	Male (n=383) (Mean ± SD)	Female (n=438) (Mean ± SD)	t-value	p-value
Weight (kg)	52.18±9.16	51.47±8.95	1.111	0.267
Height (cm)	162.13±8.45	158.17±6.66	7.504	0.000*
BMI (kg/m ²)	19.75±2.71	20.51±3.11	-3.750	0.000*
Triceps (mm)	5.92±3.63	8.73±4.45	-9.823	0.000*
Biceps (mm)	4.49±3.97	5.45±4.05	-3.428	0.001*
Waist (cm)	69.05±6.36	70.52±7.06	-3.106	0.002*
Hip (cm)	84.76±8.01	86.67±7.85	-3.437	0.001*
WHR (cm)	0.82±0.10	0.81±0.10	0.672	0.502
Body fat (%)	14.98±7.96	23.20±7.77	-14.953	0.000*

*Statistically significant ($p \leq 0.05$)

Table 3: Prevalence of Obesity (*Body Mass Index* for Age Percentile).

	Frequency	percentage
Underweight	105	12.8
Normal	677	82.5
Overweight	18	2.2
Obese	21	2.6
Total	821	100.0

Table 4: Mean Nutrient Intake of Respondents (Male and Female).

NUTRIENT	RANGE	MEAN ± SD
Calorie (kcal)	1039.98 – 2197.00	1726.82±327.45
Protein (g)	10.96 – 57.78	39.32±10.74
Carbohydrate (g)	89.80 – 294.00	170.61±56.49
Fiber (g)	0.00 – 68.94	13.07±10.69
Fat (g)	1.22 – 54.21	29.90±14.07
Vitamin A (RE)	19.55 – 978.89	478.42±293.74
Vitamin C (mg)	0.00 – 89.90	7.18±5.70
Folate (mcg)	0.00 – 642.10	136.61±118.14
Vitamin B12 (mcg)	0.00 – 6.38	1.42±1.15
Calcium (mg)	27.00 – 885.72	305.25±216.17
Zinc (mg)	0.01 – 15.88	6.88±2.96
Iron	3.2 – 21.1	11.31±4.70

2.6% were below 5th percentile while 2.6% percentile were above 95th percentile. Prevalence of obesity among male and female were 0.8% and 1.8%. Female overweight was 2.2% (Table 3).

Mean nutrient intake of respondents: In the energy section, the mean value of both female and male 1685.69 ± 302 kcal and 1767.96 ± 349.25 kcal were less than the RDA by 23.38%. Carbohydrate mean intakes of the respondents were above the RDA by 126.98% and 135.50% for both female and male, while Fat, Iron and Zinc mean intakes were within RDA. Mean intake of Protein, Vitamin A, vitamin C, Vitamin B₁₂, Folate, and Calcium were below recommended daily allowance for male and female while mean intake of Fat, Iron and Zinc were within RDA for both sex (Table 3).

Discussion

The study sought to assess prevalence of obesity among adolescents in secondary schools by determining socio-economic, demographic, anthropometric, dietary and nutrient intake.

Body mass and height are the most important measures of growth, development and reflect health condition and maturity of an individual [9]. The finding that body mass and stature increase with increasing age is consistent with biological processes in adequately nourished children [10]. Among public and private school respondents male were heavier and taller than female with no significant difference between male and female weight. Height shows significant difference between the male and female.

In contrast to the study of Mantsena *et al.* [11] reported boys as having significantly higher body mass and increased stature in a study conducted on rural South African school children aged 5 to 14 years. Similarly, the stature of Nigerian children in this study was comparable with Senegalese children aged 10 to 13 years [12], however, the body mass of the participants in the study by Benefice and Ndiaye was lower compared to Nigerian children in the present study.

Body mass index changes with growth from infancy through childhood to adolescence [13]. BMI demonstrated significant sex differences with high mean values in girls. This finding is in contrast with the [14] Monyeki *et al.* study, which found non-significant differences in BMI in South African rural primary school children. However, the BMI values obtained from Monyeki *et al.* [14] study were lower than the BMI values in this study. With the use of boundary BMI values calculated by [15], the percentage of overweight and obesity of respondents was calculated in the group of respondents examined. Obesity 2.6%, Overweight 2.2%. BMI-for-age however, might not necessarily be appropriate in suggesting that so many of this study's children are largely exempt from overweight or obesity. The BMI values may actually be misleading due to the body proportions of these children. Pawloski *et al.* [16] have reported that little is known regarding specific BMI values in adolescence and their relationships with concurrent or future risks and that the BMI-for-age curves do not necessarily 'provide a desirable pattern that should be used as a healthy goal for adolescents internationally'.

The finding that waist circumference and hip circumference increased more in male than in female with significant difference between male and female. The sex difference in waist circumference is unclear, in that it may be that levels of physical activity are less in girls than in the boys, as research have suggested that waist circumference has stronger associations with physical activity in young people [17]. Waist circumference increased with age is consistent with the literature, since during puberty, males deposit adipose tissue around the upper body whilst females deposit adipose tissue around the thighs and buttocks due to the production of sex hormones of oestrogen and testosterone in females and males, respectively [18]. Waist-hip ratio shows no significant difference between male and female

Conclusion and Recommendation

The prevalence of obesity among adolescents in secondary schools in Oyo State is lower than those found in the literature. The actual prevalence of obesity is low. The prevalence of obesity is highest among females who are within the age group of 15 - 18 years. Technology has contributed many wonderful conveniences in our society but at the expense of creating a remarkably sedentary lifestyle with no end in sight. It is all up to us to make our children more physically active and in many ways develop in them the idea to choose more properly the kind of food they eat.

Parents should make time for the family to engage in sports activities and other regular physical activities like walking or hiking, swimming, and bicycling. Also, they must encourage their children to perform household chores that will make them

more physically active. Schools must provide opportunities for daily physical education and comprehensive health education. PE classes should incorporate aerobic exercises and recreational activities.

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